

69755 - Bioeconomy

Syllabus Information

Academic Year: 2021/22

Subject: 69755 - Bioeconomy

Faculty / School: 100 - Facultad de Ciencias

Degree: 627 -

ECTS: 6.0

Year: 01

Semester: Second semester

Subject Type: Optional

Module:

1. General information

1.1. Aims of the course

The Bioeconomy course is aimed at understanding the functioning of biorefineries, including the features of the raw materials and the products obtained. This objective is aligned with Sustainable Development Goal (SDG) No. 12 (Responsible consumption and production) of the United Nations 2030 Agenda (<https://www.un.org/sustainabledevelopment/es/>), in such a way that the acquisition of the learning results of the course provides training and competence to contribute to some extent to its achievement.

1.2. Context and importance of this course in the degree

The Bioeconomy course is taught in the second semester as an optional course in the scientific-technical module. It is designed for students with Science or Engineering degrees to address the use of natural resources of biological origin. This subject allows us to understand the functioning of biorefineries, including the characteristics of the raw materials and the products obtained. The subject is taught from the University of Lleida.

1.3. Recommendations to take this course

Regular use of the teaching platform and daily study of the concepts presented are recommended, with special emphasis on solving practical activities. Likewise, it is vital to consult the doubts and questions that pose difficulties in the teaching and learning process, for which personalised tutorials should be used.

2. Learning goals

2.1. Competences

BASIC COMPETENCES

CB6 - Have demonstrated knowledge and understanding that is founded upon and extends and/or enhances that typically associated with the first cycle, and that provides a basis or opportunity for originality in developing and/or applying ideas, often within a research context.

CB7 - Can apply their knowledge and understanding, and problem solving abilities in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study.

CB8 - Have the ability to integrate knowledge and handle complexity, and formulate judgements with incomplete or limited information, but that include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgements.

CB9 - Can communicate their conclusions, and the knowledge and rationale underpinning these, to specialist and nonspecialist audiences clearly and unambiguously.

CB10 - Have the learning skills to allow them to continue to study in a manner that may be largely self-directed or autonomous.

GENERAL COMPETENCES

CG1 - Obtain information in Spanish and English using information technologies efficiently

CG2 - Manage, critically analyse and synthesize information

CG3 - Critically reflect in a systemic way and using causal relationships

CG4 - Formulate, analyse, evaluate and compare in a multidisciplinary way new or alternative solutions for different problems

CG5 - Work in interdisciplinary groups

CG6 - Transmit information efficiently through information and communication technologies

CG7 - Develop management skills (decision making, goal setting, problem definition, design, and evaluation)

CG8 - Properly manage available resources on time

2.2. Learning goals

The student, passing this subject, achieves the following results:

1. Know the main processes and products related to biorefineries.
2. Know the end-use products, obtaining and characteristics, coming from renewable sources.

2.3. Importance of learning goals

Obtaining the learning results is essential to contribute to the territorial structuring and the incorporation of talent that contributes knowledge for decarbonisation, the improvement of energy efficiency, and the value chain by understanding the operation of biorefineries, including the characteristics of raw materials and products, obtained.

3. Assessment (1st and 2nd call)

3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

The course will be evaluated using two assessment methods (continuous and global), so that the student will be assigned the grade that is most beneficial to him. For this, the grades obtained in the following tests will be used:

* Report (rated I). The report will consist of a memory on a topic related to the subject or the critical analysis of a research or popular article. The student must develop 4 to 6 questions. The structure and format of the required reports will be communicated to students through moodle.

* Public presentation on a topic related to the European Commission's strategy to promote sustainable research (currently the Horizon Europe program) (rated P).

* Workshops (rated T). A workshop will be held on the origin and necessity of the circular economy movement, it will be an interactive activity for students and teachers in class. The workshop will assess student participation by asking meaningful questions. The number of interventions and the interest of the questions will be assessed.

* Final short, long and/or development answer test (scored as F). The test will be held simultaneously at each university under conditions that guarantee the proper identification of students and the impossibility of fraud in them.

The grades obtained by each student in the aforementioned evaluation activities will be weighted according to the following formulas:

Formula 1:

Final mark of the course: $(0.2 \times I) + (0.2 \times P) + (0.1 \times T) + (0.5 \times F)$

Formula 2:

Final grade for the course: F

It is not necessary to achieve minimum marks in the evaluation tests for the application of the above formulas. The final grade for the course will be the best grade obtained in each case after applying formula 1 and formula 2.

The number of official exam sessions to which enrollment entitles (2 per enrollment) as well as the consumption of these calls will be adjusted to the Rules of Permanence in Master's Studies and the Rules of Learning Assessment of the University of Zaragoza (<https://ciencias.unizar.es/normativas-asuntos-academicos>). To this last regulation, the general criteria for the design of the tests and the grading system will also be adjusted, and according to the same, the time, place and date on which the review will be held when publishing the qualifications will be made public.

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

Learning in this subject is based on the combination of the expository method and the flipped classroom.

According to the expository method, the professor develops the presentation of the topics before the students present in the same classroom or other universities through videoconference. In addition, other teaching materials will be included in the Moodle platform that will allow dedicating some of the classes to interact with students, posing questions that allow relating concepts.

The preparation of theoretical works consists of writing reports on a topic assigned by the teacher following her instructions and with her tutoring. The works will be exhibited publicly.

The workshop consists of a supervised session where students work individually or in groups and receive assistance and guidance when necessary from the teaching staff.

All these training activities will be supported by tutorials from teachers via videoconference.

4.2. Learning tasks

Master class: 13 hours

Problem and case solving: 2 hours

Teaching work: 58 hours

Study: 77 hours

4.3. Syllabus

1. Oil: composition and impact (economic, ecological, social, geopolitical).
2. Biomass: classification, composition, impact.
3. Biorefineries: lignocellulosic, sugar, whole-crop, for biofuels, thermochemical processing.
4. Biofuels: bioethanol, biodiesel, biogas.
5. Biomass-based solvents: 2-methyltetrahydrofuran, dehydrolevoglucosenone (Cyrene?), eutectics, ionic liquids, etc.
6. Biocomposites (furfural, lactic acid, etc.) and their applications: pharmacy, cosmetics, fuel additives, food additives, biopesticides.
7. Biomaterials: cellulose, biopolymers, biochar.
8. Bieconomy impact.

4.4. Course planning and calendar

Information on schedules, calendar, and exams is published on the Master's page on the website of the Faculty of Sciences of the University of Zaragoza (<https://ciencias.unizar.es/master-en-economia-circular>). The presentation of reports will be carried out according to the calendar that will be announced in due course through the Moodle page of the subject.

4.5. Bibliography and recommended resources

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=69755&Identificador=C74185>